



# SPN3456

## N-Channel Enhancement Mode MOSFET

### DESCRIPTION

The SPN3456 is the N-Channel logic enhancement mode power field effect transistors are produced using high cell density , DMOS trench technology.

This high density process is especially tailored to minimize on-state resistance.

These devices are particularly suited for low voltage application such as cellular phone and notebook computer power management and other battery powered circuits, and low in-line power loss are needed in a very small outline surface mount package.

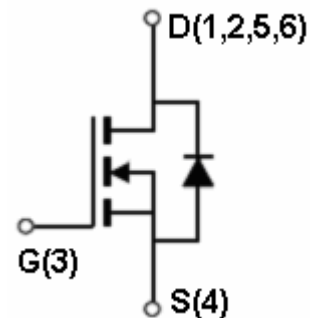
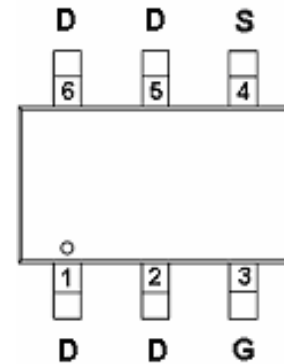
### FEATURES

- ◆ 30V/6.0A,  $R_{DS(ON)} = 40\Omega @ V_{GS} = 10V$
- ◆ 30V/5.0A,  $R_{DS(ON)} = 50\Omega @ V_{GS} = 4.5V$
- ◆ Super high density cell design for extremely low  $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ TSOP-6P package design

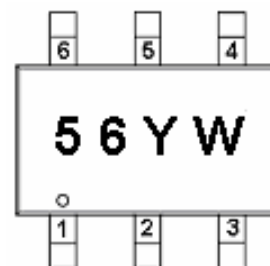
### APPLICATIONS

- Power Management in Note book
- Portable Equipment
- Battery Powered System
- DC/DC Converter
- Load Switch
- DSC
- LCD Display inverter

### PIN CONFIGURATION( TSOP- 6P )



### PART MARKING



Y : Year Code  
W : Week Code



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### PIN DESCRIPTION

Pin	Symbol	Description
1	D	Drain
2	D	Drain
3	G	Gate
4	S	Source
5	D	Drain
6	D	Drain

### ORDERING INFORMATION

Part Number	Package	Part Marking
SPN3456ST6RG	TSOP-6P	56YW

※ Week Code : A ~ Z ( 1 ~ 26 ) ; a ~ z ( 27 ~ 52 )

※ SPN3456ST6RG : Tape Reel ; Pb – Free

### ABSOLUTE MAXIMUM RATINGS

( $T_A=25^{\circ}\text{C}$  Unless otherwise noted)

Parameter	Symbol	Typical	Unit	
Drain-Source Voltage	$V_{DSS}$	30	V	
Gate –Source Voltage	$V_{GSS}$	$\pm 20$	V	
Continuous Drain Current( $T_J=150^{\circ}\text{C}$ )	$I_D$	$T_A=25^{\circ}\text{C}$	6.0	A
		$T_A=70^{\circ}\text{C}$	5.0	
Pulsed Drain Current	$I_{DM}$	30	A	
Continuous Source Current(Diode Conduction)	$I_S$	1.7	A	
Power Dissipation	$P_D$	$T_A=25^{\circ}\text{C}$	2.0	W
		$T_A=70^{\circ}\text{C}$	1.3	
Operating Junction Temperature	$T_J$	150	$^{\circ}\text{C}$	
Storage Temperature Range	$T_{STG}$	-55/150	$^{\circ}\text{C}$	
Thermal Resistance-Junction to Ambient	$R_{\theta JA}$	90	$^{\circ}\text{C}/\text{W}$	



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### ELECTRICAL CHARACTERISTICS

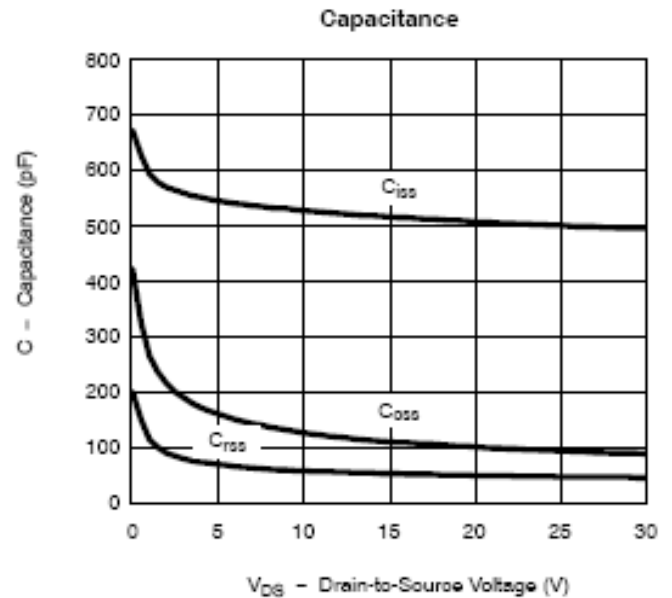
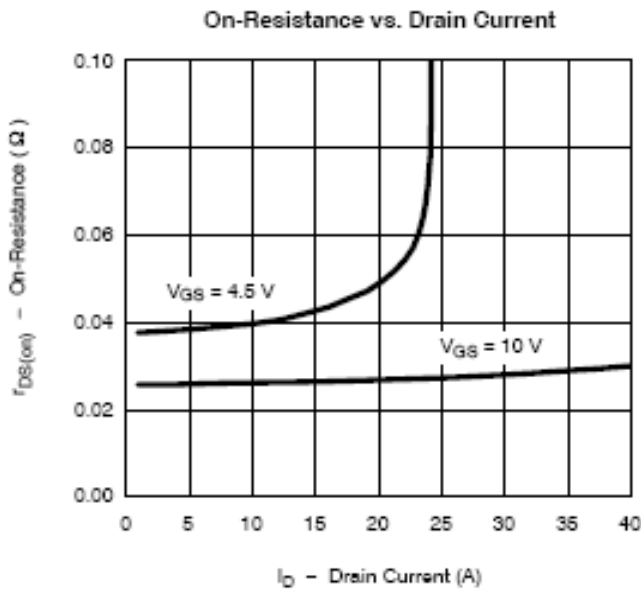
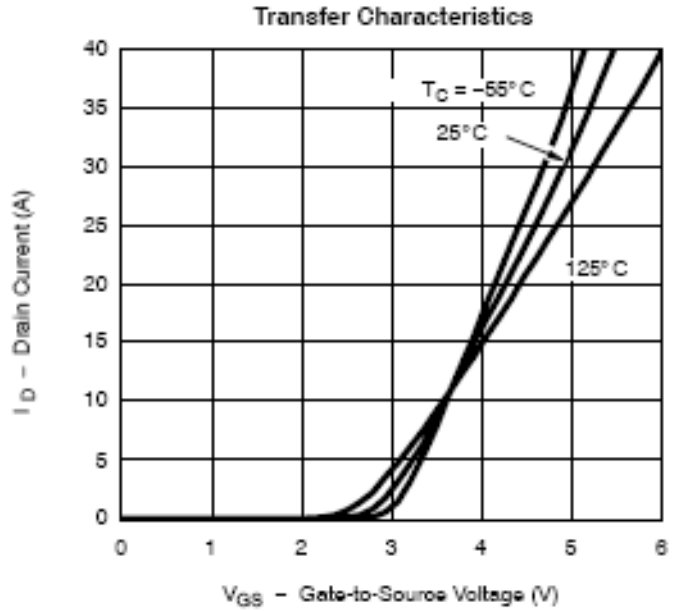
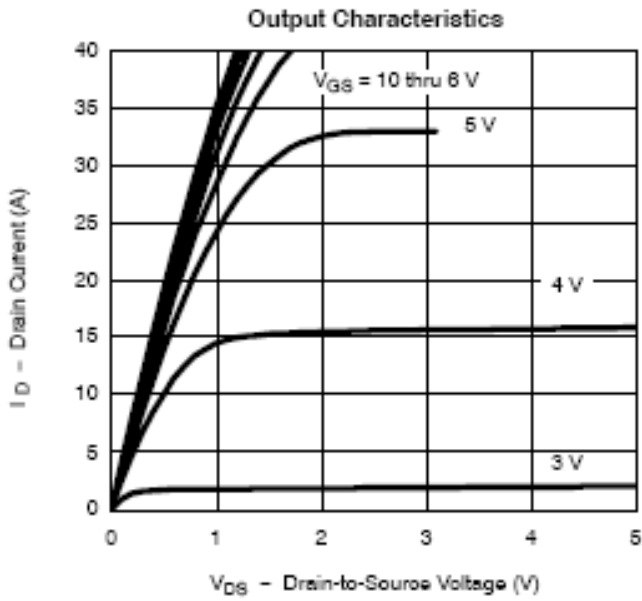
(TA=25°C Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	30			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.0		3.0	
Gate Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V			±100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =24V, V <sub>GS</sub> =1.0V			1	μA
		V <sub>DS</sub> =24V, V <sub>GS</sub> =0.0V T <sub>J</sub> =55°C			10	
On-State Drain Current	I <sub>D(on)</sub>	V <sub>DS</sub> ≥ 4.5V, V <sub>GS</sub> =4.5V	10			A
Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> =6.0A		0.030	0.040	Ω
		V <sub>GS</sub> = 4.5V, I <sub>D</sub> =5.0A		0.040	0.050	
Forward Transconductance	g <sub>fs</sub>	V <sub>DS</sub> =4.5V, I <sub>D</sub> =5.4A		12		S
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =1.7A, V <sub>GS</sub> =0V		0.8	1.2	V
<b>Dynamic</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =10V I <sub>D</sub> =6.7A		10	18	nC
Gate-Source Charge	Q <sub>gs</sub>			1.6		
Gate-Drain Charge	Q <sub>gd</sub>			3.2		
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V f=1MHz		450		pF
Output Capacitance	C <sub>oss</sub>			240		
Reverse Transfer Capacitance	C <sub>rss</sub>			38		
Turn-On Time	t <sub>d(on)</sub>	V <sub>DD</sub> =15V, R <sub>L</sub> =15 I <sub>D</sub> =1.0A, V <sub>GEN</sub> =10 R <sub>G</sub> =6Ω		7	15	ns
	t <sub>r</sub>			10	20	
Turn-Off Time	t <sub>d(off)</sub>			20	40	
	t <sub>f</sub>			11	20	



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## TYPICAL CHARACTERISTICS

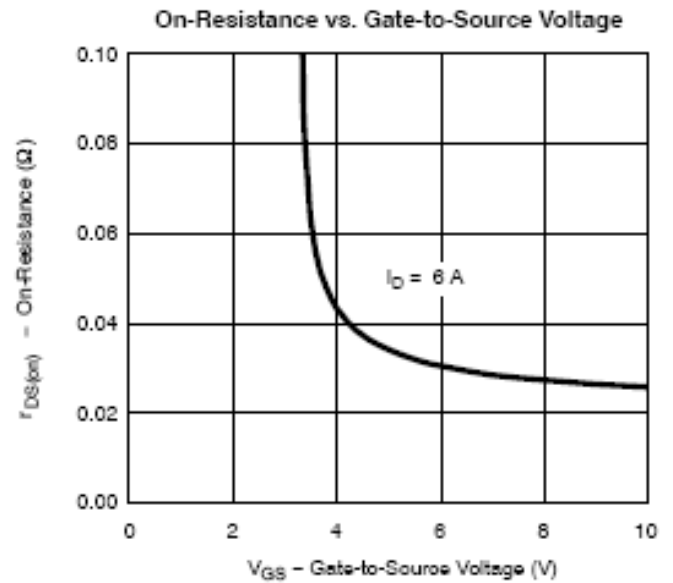
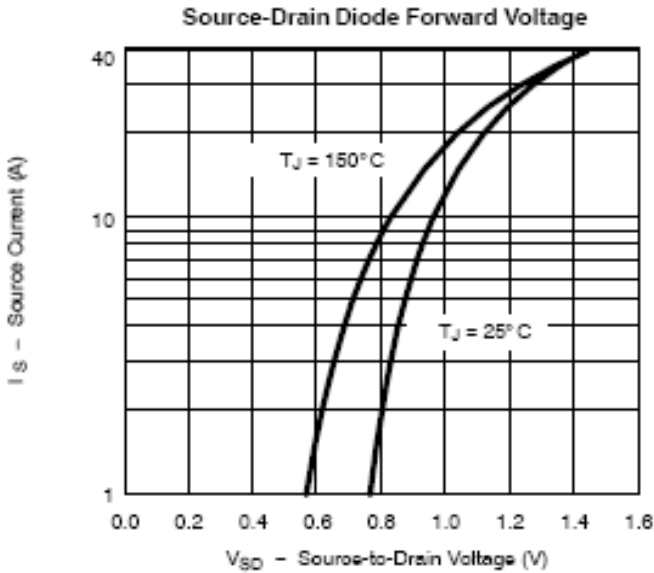
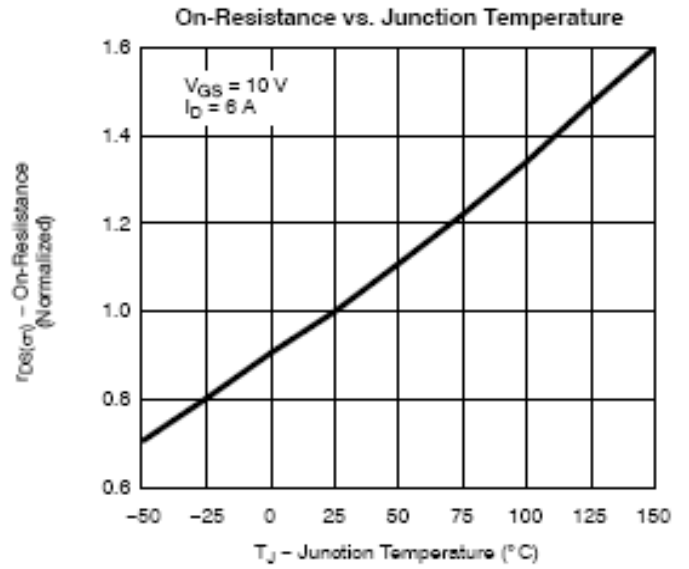
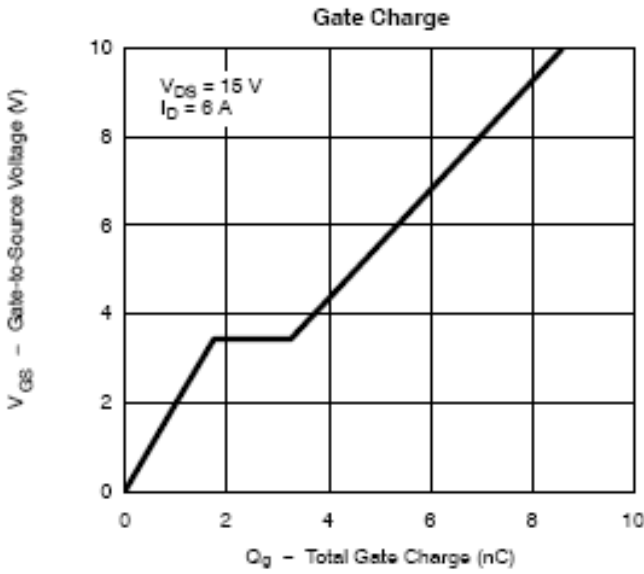




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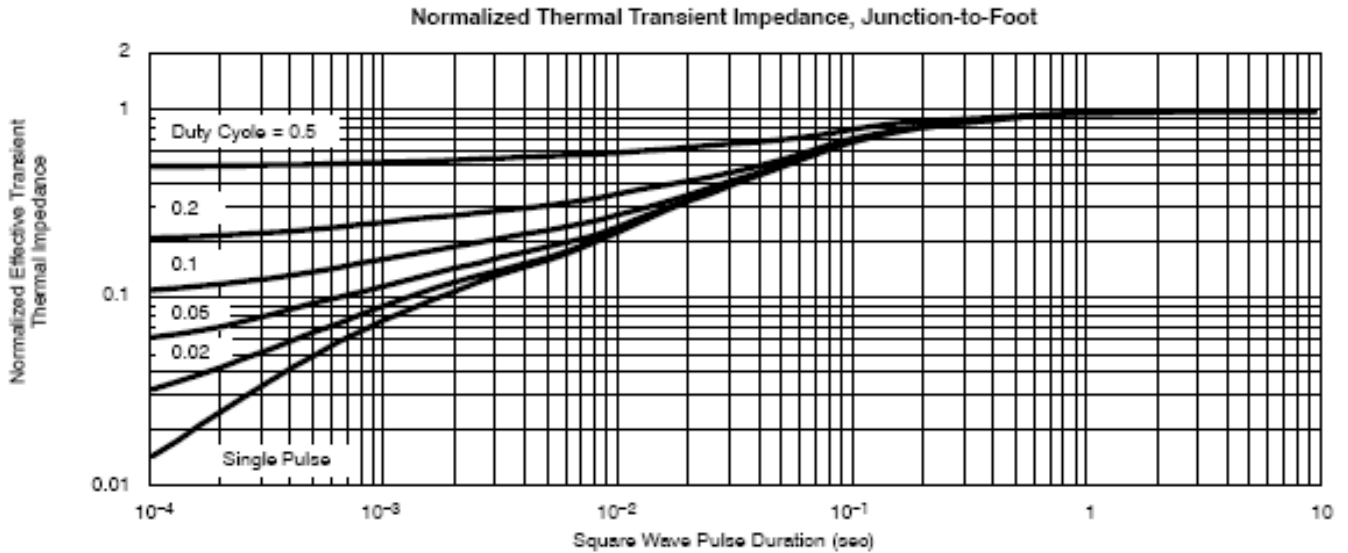
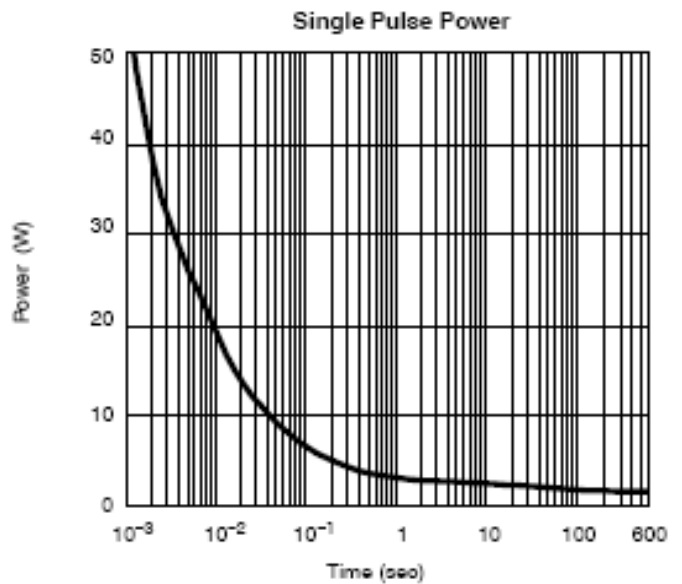
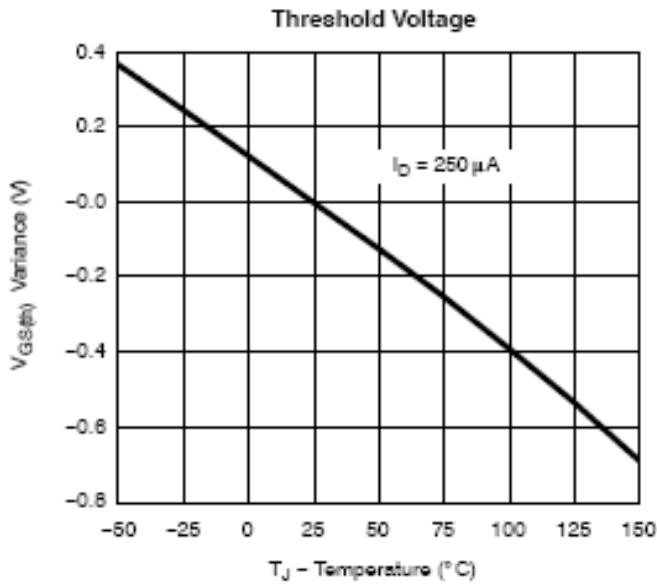
### TYPICAL CHARACTERISTICS





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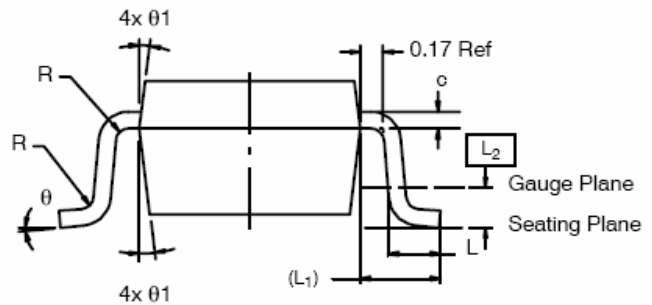
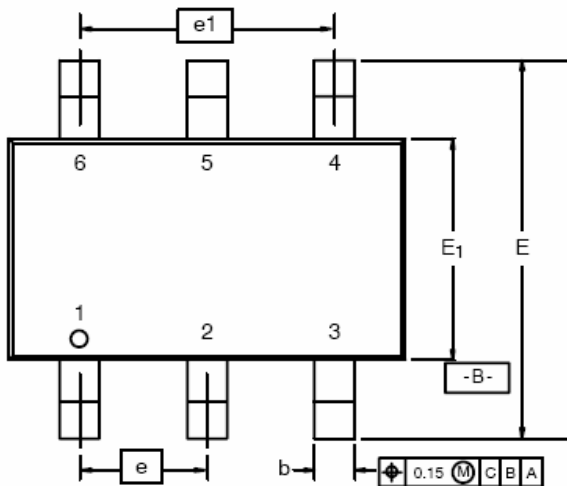




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### TSOP- 6P PACKAGE OUTLINE



Dim	MILLIMETERS			INCHES		
	Min	Nom	Max	Min	Nom	Max
<b>A</b>	0.91	-	1.10	0.036	-	0.043
<b>A<sub>1</sub></b>	0.01	-	0.10	0.0004	-	0.004
<b>A<sub>2</sub></b>	0.90	-	1.00	0.035	0.038	0.039
<b>b</b>	0.30	0.32	0.45	0.012	0.013	0.018
<b>c</b>	0.10	0.15	0.20	0.004	0.006	0.008
<b>D</b>	2.95	3.05	3.10	0.116	0.120	0.122
<b>E</b>	2.70	2.85	2.98	0.106	0.112	0.117
<b>E<sub>1</sub></b>	1.55	1.65	1.70	0.061	0.065	0.067
<b>e</b>	1.00 BSC			0.0394 BSC		
<b>e<sub>1</sub></b>	1.90	2.00	2.10	0.075	0.080	0.085
<b>L</b>	0.35	-	0.50	0.014	-	0.020
<b>L<sub>1</sub></b>	0.60 Ref			0.024 Ref		
<b>L<sub>2</sub></b>	0.25 BSC			0.010 BSC		
<b>R</b>	0.10	-	-	0.004	-	-
<b>θ</b>	0°	4°	8°	0°	4°	8°
<b>θ<sub>1</sub></b>	7° Nom			7° Nom		



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